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09/647,489	09/29/2000	Hidetoshi Saito	216-415P	8093

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EXAMINER

SAVAGE, JASON L

ART UNIT

PAPER NUMBER

1775

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Please find below and/or attached an Office communication concerning this application or proceeding.

# Office Action Summary

Application No.

09/647,489

Applicant(s)

SAITO ET AL.

Examiner

Jason L. Savage

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

## Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

- 1) ☒ Responsive to communication(s) filed on 29 September 2000.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

## Disposition of Claims

- 4) ☒ Claim(s) 1-13 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-13 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

## Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 29 September 2000 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on \_\_\_\_\_ is: a) ☐ approved b) ☐ disapproved by the Examiner.  
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

## Priority under 35 U.S.C. §§ 119 and 120

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All   b) ☐ Some \* c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

## Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)                      4) ☐ Interview Summary (PTO-413) Paper No(s). \_\_\_\_\_
- 2) ☒ Notice of Draftsperson's Patent Drawing Review (PTO-948)                      5) ☐ Notice of Informal Patent Application (PTO-152)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 3.                      6) ☐ Other: \_\_\_\_\_

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***Claim Rejections - 35 USC § 102***

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless -

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

(e) the invention was described in a patent granted on an application for patent by another filed in the United States before the invention thereof by the applicant for patent, or on an international application by another who has fulfilled the requirements of paragraphs (1), (2), and (4) of section 371© of this title before the invention thereof by the applicant for patent.

The changes made to 35 U.S.C. 102(e) by the American Inventors Protection Act of 1999 (AIPA) do not apply to the examination of this application as the application being examined was not (1) filed on or after November 29, 2000, or (2) voluntarily published under 35 U.S.C. 122(b). Therefore, this application is examined under 35 U.S.C. 102(e) prior to the amendment by the AIPA (pre-AIPA 35 U.S.C. 102(e)).

2. Claims 1, 9 and 11-13 are rejected under 35 U.S.C. 102(b) as being anticipated by JP'597 (JP 50-6597).

JP'597 teaches a method for producing zinc oxide whiskers on the surface of a substrate by heating a zinc alloy to gasify the alloy in and which will react with oxygen to form the oxide whiskers (translation, scope of claim for patent).

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JP'597 does not teach the orientation of the needles, the weighted average circle-based diameter, the weighted average aspect ratio or the density of the needles; however, JP'597 teaches the same method of forming the needles which is claimed, therefore the needles of JP'597 would have the same orientation, structure and density and thus would meet all of the claim limitations. Also, the figure of JP'597 shows the needles (8) as being substantially parallel and having an aspect ratio which appears to be greater than that claimed by Applicant. Furthermore, the claimed ranges for the average circle-based diameter, average aspect ratio and density are so broad that it would be reasonable to expect the whiskers of JP'597 to fall within the claimed ranges.

Regarding claim 11, although JP'597 does not explicitly state the pressure is atmospheric, it does not teach that any specific pressure is required. Therefore it is the position of the Examiner that the pressure in the process of JP'597 is atmospheric.

3. Claims 1 and 6 are rejected under 35 U.S.C. 102(b) as being anticipated by Hijikihigawa et al (US 5,140,393).

Hijikihigawa teaches a sensor device which has a surface shaped to exhibit improved performance (col. 1, ln. 11-24). Hijikihigawa further teaches that by increasing the surface area of the sensor, it will exhibit enhanced detection sensitivity (col. 5, ln. 56-60). The increased surface area is provided by forming metal oxide projections such as tin oxide in various shapes such as trapezoidal, pyramidal, conical or semispherical (col. 4, ln. 53 - col. 5, ln. 14) and the

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projections are shown to be substantially oriented in a parallel direction (Figure 1(a)).

Hijikihigawa also teaches that the projections can be suitably sized so as to have a specified shape and dimensions (col. 5, ln. 46-55).

Hijikihigawa is silent to the diameter and density of the projections; however it does teach that the distance  $d$  as shown in Figure 1(a) can be from 0.1 to several micrometers (col. 5, ln. 25-28). This is taken as a teaching that the projections have dimensions on the same scale and thus would meet the limitation of having diameters less than 10,000  $\mu\text{m}$  and a whisker density within the claimed range.

Regarding the claimed aspect ratio of 0.1, the projections in Figure 1(a) appear to be just as high as they are wide and thus would meet the claim limitation.

### ***Claim Rejections - 35 USC § 103***

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. Claims 2-8 and 10 are rejected under 35 U.S.C. 103(a) as being unpatentable over JP'597 (JP 50-6597).

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Regarding claim 2, it is the position of the Examiner that the substrate material to which the whiskers of JP'597 are bonded is a substance which secures the whiskers together. JP'597 is silent to the specific substrate material used; however, absent a teaching of the criticality of the claimed materials, it does not provide a patentable distinction over the prior art since it would have been obvious to one of ordinary skill in the art at the time of the invention to have used any material for the substrate that could readily form and secure the oxide whiskers.

Regarding claims 3-8, JP'597 is silent to the intended use of the formed structure; however, the recitations that the functional element is an emission element, capacitor element, memory element, sensor element, laser emission element and optical switch are at best statements of intended use. Statements of intended use are not considered patentable distinguishing limitations. See Ex parte Masham 2 U.S.P.Q. 2d 1647, 1648. In re Tahuau 135 F.2d 344, 47 U.S.P.Q. 324. Application of Hack, 245 F.2d 246, 114 U.S.P.Q. 161. Therefore, the intended use statements recited in claims 3-8 do not patentably distinguish the present invention from the prior art.

Regarding claim 10, JP'597 teaches what is set forth above but is silent to the use of a carrier gas. however the use of a carrier gas to transport the metal compound gas is known in the art. It would have been obvious to one of ordinary skill in the art at the time of the invention to have used a carrier gas in conjunction with the metal compound gas so that the vaporized metal compound could readily mix and react with the oxygen-containing atmosphere and form the zinc oxide whiskers.

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6. Claims 1-5, 7-8 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hijikihigawa et al (US 5,140,393).

Regarding the limitation that the aspect ratio be 0.1 or more, Hijikihigawa teaches that it is advantageous to maximize the surface area of the sensor (col. 5, ln. 56-60). Therefore it would have been obvious to one of ordinary skill in the art at the time of the invention to have formed the oxide whiskers of Hijikihigawa with as large of an aspect ratio as possible in order to maximize the surface area of the sensor.

Regarding claim 2, it is the position of the Examiner that the substrate material to which the whiskers of Hijikihigawa are bonded is a substance which secures the whiskers together. Hijikihigawa teaches that the substrate may be an inorganic substance such as glass or ceramic (col. 4, ln. 53-59).

Regarding claims 3-5 and 7-8, although Hijikihigawa is silent to formed structure being used as an emission element, capacitor element, memory element, laser emission element and optical switch, these recitations are at best statements of intended use. Statements of intended use are not considered patentable distinguishing limitations. See Ex parte Masham 2 U.S.P.Q. 2D 1647, 1648. In re Tahuau 135 F.2d 344, 47 U.S.P.Q. 324. Application of Hack, 245 F.2d 246, 114 U.S.P.Q. 161. Therefore, the intended use statements recited in claims 3-5 and 7-8 do not patentably distinguish the present invention from the prior art.

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7. Claims 9-13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hijikihigawa et al (US 5,140,393) in view of JP'597 (JP 50-6597).

Hijikihigawa teaches what is set forth above and that the oxide whiskers may be formed by a number of different methods including crystal growth (col. 4, ln. 55-59) but it is silent to using the claimed method for forming the oxide whiskers. JP'597 teaches a method for producing zinc oxide whiskers on the surface of a substrate by heating a zinc alloy to gasify the alloy in and which will react with oxygen to form the oxide whiskers (translation, scope of claim for patent). It would have been obvious to one of ordinary skill in the art at the time of the invention to have used a crystal growth method such as the one taught by JP'597 to form the whiskers of Hijikihigawa since it specifically states a crystal growth method may be used to form the whiskers.

Regarding claim 11, although JP'597 does not explicitly state the pressure is atmospheric, it does not teach that any specific pressure is required. Therefore it is the position of the Examiner that the pressure in the process of JP'597 is atmospheric

***Prior Art Made of Record but not Relied Upon***

8. The following is a list of the prior art made of record but not relied upon:

Park et al. (US 5,447,878) teaches a capacitor and that the capacitance of the capacitor can be increased by increasing the surface area of the element by forming an uneven topography on the surface of the element (col. 2, ln. 25-32).



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Takahashi et al. (US 5,479,106) teaches a needle shaped probe which utilizes the electrooptic effect and can be used with laser light (col. 5, ln. 18-61).

Gray et al. (US 4,307,507) teaches an electron emission element having needle shaped field-emitter tips (abs).


JP-63181305 teaches a method of forming needle projections on a film by vaporizing and mixing two metal compounds, then reacting the vaporized gas with oxygen to form the needle projections (abs).

9. Any inquiry to this communication or earlier communications from the Examiner should be directed to Jason Savage, whose telephone number is (703)305-0549. The Examiner can normally be reached Monday to Friday from 6:30 AM to 4:00 PM.

If attempts to reach the Examiner by telephone are unsuccessful, the Examiner's supervisor, Deborah Jones, can be reached on (703)308-3822.

Any inquiry of a general nature or relating to the status of this application should be directed to the Group receptionist whose telephone number is (703)308-2351.

  
Jason Savage

  
DEBORAH JONES  
SUPERVISORY PATENT EXAMINER

6-13-02